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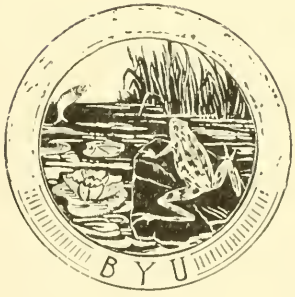
The Great Basin Naturalist

Volume VII, 1946

Vasco M. Tanner, *Editor*



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Vasco M. Tanner, *Editor*

C. Lynn Hayward, *Assistant Editor*

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APHIDS FROM MT. TIMPANOGOS, UTAH[1]

Part 2

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An unusual aphid was collected by Dr. C. Lynn Hayward on *Monarda* (?) at Aspen Grove, Mt. Timpanogos, Utah, June 13, 1940. This aphid fits no genus or species with which the writer is acquainted. Appreciation is expressed to Professor M. A. Palmer for her suggestions concerning this interesting aphid.

Utamphorophora Knowlton, n. gen.

Frontal tubercles moderately developed, *Myzus*-like, but possessing finger-like projections resembling those in *Phorodon*; antennae approximately length of body, bearing hairs which are sparse and inconspicuous; cornicles long and swollen, as in *Amphorophora*; cauda long, constricted near middle, as in many species of *Amphorophora* and *Macrosiphum;* wings with normal venation as in *Macrosiphum.*

Type: *Utamphorophora timpanogos* Knowlton.

Utamphorophora timpanogos Knowlton, n. sp.

Alate vivipara: Body 2.4 mm. long and 1.8 across the abdomen; ocular tubercles present; antennae dusky on mature specimens, 2.3 mm. long, armed with a few inconspicuous hairs; antennal tubercles distinctly exceed vertex, somewhat gibbus, each possessing a finger-like projection; antennal III, .68 to .71 mm., armed with 5 to 12 rounded sensoria (5 and 8 on one specimen, 9 and 12 on another); IV, .42 to .442, without sensoria; V, .395 to .426; VI, .14 to .15 plus .73 to .79 mm.; rostrum reaching meso-thorax, rostral tip slenderly obtuse; ros-

1 Continued from Great Basin Naturalist, 3: 5 - 8, 1942.

tral IV, + V, .1 mm.; hind tibia 1.65 to 1.73; hind tarsi .126; legs dusky; cornicles and cauda as in many *Amphorophora;* cornicles dusky, .47 to .49, swollen over distal two-thirds of their length; cauda less dusky than legs and cornicles, with two pairs of lateral hairs on portion beyond median constriction, .28 mm. long.

Nymphs with wingpads: Antennal tubercles gibbus, *Myzus*-like plus conspicuous, converging, triangular *Phorodon*-like projections.

Taxonomy: *U. timpanogos* n. sp. resembles *Myzus monardae* Williams but differs in possessing longer cornicles and cauda, with constriction in middle of cauda. It resembles *Phorodon menthae* (Buckton), from which it differs in having swollen, longer cornicles and constricted cauda.

The following species of aphids have been collected around the Mt. Timpanogos Loop, or on the slopes of Mt. Timpanogos, in Utah. Unless otherwise indicated, collections are by the writer and the locality is Mt. Timpanogos. Additional distribution has been added for many of the species.

Cinara taxifoliae (Swain) (?) collected on *Pseudotsuga* at Aspen Grove, Mt. Timpanogos, August 26, 1943.

Schizolachnus pini-radiatae (Dvd.) on *Pinus ponderosa,* Mt. Timpanogos, July 12, 1942 and July 26, 1945. Also collected at Verdi, Nevada, August 17, 1945; Big Timber, Montana, June 4, 1942 (H. F. Thornley); Mt. Nebo, July 12, 1942; Beaver Canyon and Beaver Mt., Utah, July 10, 1942.

Anoecia querci Fitch, Mt. Timpanogos and Provo Canyon on *Cornus stolonifera,* September 21, 1935. Also taken in the Grand Canyon of the Snake River, Wyoming, September 11, 1941; Mt. Sterling, Utah, September 25, 1935.

Drepanaphis granovskyi S.-K. along Mt. Timpanogos loop road on *Acer grandidentatum,* July 26, 1945.

Drepanosiphum braggii Gillette, American Fork Canyon and Mt. Timpanogos, July 26, 1945, on *Acer negundo.* Also taken on boxelder at Flagstaff, Arizona, September 22, 1944; Fish Haven, Idaho, August 2, 1945.

Myzocallis alhambra Davidson, on *Quercus,* Big Tree Camp, June 4, 1940 (C. L. Hayward.). Also taken at Mt. Nebo, July 12, 1942, Marysvale Canyon; Beaver Mt., Utah, July 10, 1942.

Calaphis coloradensis Granovsky, along "Timp" loop on *Betula fontinalis,* July 26, 1945. Also taken in Wolf Creek Canyon, July 24, 1945, an *Anthocoris melanocerus* Reuter observed to be feeding on a wingless specimen; Smithfield Canyon, July 1, 1940.

Chaitophorus populifoliae Oestlund on *Populus,* Big Tree Camp, Mt. Timpanogos, July 16, 1940 (C. L. Hayward).

Pterocomma leutahensis (Ckl.), foothills of Mt. Timpanogos on *Salix*, June 4, 1942; on *Populus*, Fish Lake, July 28, 1926.

Clavigerus bicolor (Oest.), on *Salix*, Mt. Timpanogos and Mt. Nebo, July 12, 1942. Also on *Salix lutea* at Big Cottonwood Canyon, Utah, June 29, 1925; on *Salix* at Manhattan, Montana, August 14, 1926 (C. B. Philip); Emigration Canyon, Idaho, June 24, 1923; Baker, Nevada, June 9, 1937 (T. O. Thatcher).

C. populifoliae (Fitch) on *Populus angustifolia*, upper American Fork Canyon, July 6, 1925; Mt. Nebo, July 12, 1942.

C. smithiae (Monell), Mt. Timpanogos, on *Salix*, July 26, 1945. Also on *Salix alba*, Farmington, Utah, July 29, 1924; at Baker, Nevada, June 9, 1937 (T. O. Thatcher); Mink Creek Canyon, Idaho, July 4, 1935; Oak Creek Canyon, Utah, July 10, 1942.

Aphis carbocolor Gillette on *Rumex*, American Fork Canyon, July 16, 1940. Also Flagstaff, Arizona, September 23, 1944; and Los Cruces, New Mexico, August 26, 1942 (B. A. Haws).

A. frangulae Kalt. on *Nepeta cataria*, Aspen Grove, July 26, 1945.

A. helianthi Monell on *Helianthus*, Mt. Timpanogos lower slopes, July 26, 1945.

A. maculatae Oest. on *Populus*, upper American Fork Canyon, June 4, 1942.

A. maidis Fitch on grass, near Aspen Grove, July 26, 1945.

A. medicaginis Koch on *Melilotus alba*, American Fork Canyon, September 21, 1935.

A. varians Patch on wild gooseberry, *Ribes*, American Fork Canyon, July 26, 1945. Also Beaver Mountain, Utah, on wild gooseberry, July 13, 1945, and Rabbit Ear Pass, Colorado, August 17, 1940; Liberty, Utah, on currant; Beaver Canyon, Idaho.

Pseudocpameibaphis glauca G.-P. at Aspen Grove on *Artemisia*, July 26, 1945.

Amphorophora cratacgi (Monell) on *Cratacgus*, near Provo Canyon along loop, August 15, 1945.

Kakimia essigi (G.-P.) on *Aquilegia*, July 26, 1945. Also on *Aquilegia rubicunda* at Monte Cristo, Utah, July 21, 1942, and Vernon Canyon, July 19, 1940; at Lake Agnes, Cameron Pass, Colorado, August 21, 1940 (Knowlton-W. P. Nye).

K. wahinkae (Hottes) on *Delphinium occidentalis*, Aspen Grove, Mt. Timpanogos, July 1927 (V. M. Tanner), and July 26, 1942 (Knowlton), on larkspur. Also Manassa, Colorado, May 14, 1943 fundatrices (B. A. Haws, Det. M. A. Palmer), and July 12, 1943 (Haws).

Macrosiphum atripes G.-P. on Mt. Timpanogos, on *Aster,* September 10, 1940 (C. L. Hayward). Also Teton Pass, Wyoming, September 13, 1941; Boise, Idaho, June 16, 1939; and Beaver Mountain, Utah, July 10, 1942.

M. coweni (Hunter) on *Artemisia tridentata,* July 26, 1945 at Mt. Timpanogos. Also Hoback, Wyoming, September 11, 1941; Emigration Pass, Nevada, July 24, 1944; Ontario, Oregon, June 17, 1939; and Steamboat Springs, Colorado, August 18, 1935.

M. cremicornum S.-K. on wild *Geranium,* Mt. Timpanogos, July 26, 1945. Also *Geranium richardsoni,* Teton Pass, Wyoming, September 13, 1941; in Logan Canyon and Monte Cristo, Utah, July 21, 1942; Mt. Nebo, July 25, 1942; Sardine Canyon, June 25, 1943; and Card Canyon, off Logan Canyon, June 16, 1940 (Knowlton-W. P. Nye). Dr. C. Lynn Hayward collected this species at Aspen Grove, July 5, 1940.

M. crigeronensis (Thomas) on *Lupinus* (?, if so probably accidental), at Hidden Lake, Mt. Timpanogos, July 27, 1940 (C. L. Hayward). Also on *Chrysothamnus viscidiflorus* and *C. nauseosus* at Linland, Colorado, August 18, 1935; on *Lactuca* at Moab, July 29, 1932; *Grindelia squarrosa,* Salem, Oregon, June 17, 1939.

M. laevigatae Essig on *Salix,* Timpanogos Loop and Provo Canyon, July 26, 1945. Also on willow at Wells, Nevada, August 16, 1945; at Stayton, Oregon, May 7, 1936 (Coll.?).

M. ludovicianae (Oestlund) on *Artemisia vulgaris,* Mt. Timpanogos, July 12, 1942.

M. macrosiphum (Wilson) on elderberry, Mt. Timpanogos loop, July 12, 1942. Also on *Amalanchier* at Portland, Oregon, June 21, 1939; Little Rock, Washington, June 18, 1937 (W. W. Baker).

M. schranki Theobald on *Urtica gracilis,* Mt. Timpanogos and Mt. Nebo, July 12, 1942; Beaver Mountain, Utah, July 10, 1942; Glenn's Ferry, Idaho, June 16, 1939; Grand Canyon of the Snake River, Wyoming, September 11, 1941; west of Reno, Nevada, August 17, 1945; Junction, Lakota and Oak Creek Canyon, Utah.

M. solanifolii (Ashm.) on wild *Geranium* and *Lactuca,* Mt. Timpanogos.

M. stanleyi Wilson on *Sambucus coerulea,* Mt. Timpanogos and North Fork of Provo River, and Daniels Canyon, Utah, July 26, 1945; Monte Cristo, August 21, 1942 (Knowlton-R. S. Roberts-S. L. Wood); males numerous on Mt. Nebo Loop, Immigration Canyon, August 14, 1943; and upper Ephraim Canyon, September 6, 1945; Shoshone Lake, Wyoming, September 11, 1941.

M. valerianae (Clarke) on *Chamaerium angustifolia*, at Cameron Pass, Colorado, August 21, 1940. Dr. Hayward collected this on *Rudbeckia* at Big Tree Camp, Mt. Timpanogos, August 2, 1940. One alate was collected on sage brush, probably an accidental host, at Monticello, Utah, June 18, 1933.

Forda olivacea Rohwer along Mt. Timpanogos Loop, on roots of giant rye grass, July 26, 1945.

Mindarus abietinus Koch on *Abies*, July 12, 1942 and July 26, 1945. Dr. C. L. Hayward had previously collected this at Aspen Grove, July 6, 1940. Also taken in Wolf Creek Canyon, July 24, 1945; and on alpine fir at Card Canyon, south of Logan Canyon, July 25, 1938 (Knowlton-W. P. Nye) in Utah; Bellines, Washington, June 1, 1935 (W. W. Baker); Puyallup, Washington, July 4, 1937 (by the late Ensign H. C. Bennion); *Abies lasiocarpa*, Pingree Park, Colorado, August 21, 1935; Puffer Lake on Beaver Mountain, July 10, 1942, and Mt. Nebo, July 12, 1942, Utah.

Supplement: Part I (Great Basin Nat. III (1) :5–8, 1942) of the "Aphids of Mount Timpanogos, Utah" was prepared principally to describe three apparently undescribed species of aphids, found among material submitted for identification by Dr. C. Lynn Hayward of the Zoology and Entomology Department of the Brigham Young University. These species were:

Myzus haywardi Knowlton, collected on *Galium* or *Rudbeckia* at Big Tree Camp, Mt. Timpanogos, Utah, June 7, 1940 (C. L. Hayward).

Macrosiphum timpanogos Knowlton was collected at Hidden Lake Camp, Mt. Timpanogos, July 23, 1940 (C. L. Hayward), without host record. It probably occurs on a lupine of some kind.

Cinara osborni Knowlton was collected on *Pseudotsuga mucronata* at Aspen Grove, Mt. Timpanogos, June 30, 1940 (C. L. Hayward).

In addition, Dr. Hayward had collected:

Macrosiphum stanleyi Wilson on *Sambucus microbotrys* at Big Tree Camp, June 4, August 1 and 2, 1940.

M. crenicornum S.-K. probably on wild *Geranium*.

Mindarus obietinus Koch on *Pseudotsuga mucronata*, which probably was an accidental host.

To this list the writer added the following species, collected chiefly from lower slopes, and along highways of the "Mt. Timpanogos Loop":

Eulachnus agilis (Kalt.) on *Pinus*, *Euceraphis gillettei* Dav. on *Alnus*, *Chaitophorus viminalis* Mon. on *Salix*, *Periphyllus negundinis*

(Th.) on *Acer negundo*, *P. populicola* (Thos.), and *Clavigerus salicis* (L.) on *Salix*, *Aphis artemisisola* Wms. on *Artemisia tridentata*, *A. gregalis* Knlt. on *Chrysothamnus viscidiflorus*, *A. ribiensis* G.-P. on *Ribes*, *Cavariella capreae* (Fab.) on *Salix*, *Epamcibaphis frigidae* Oest. on *Artemisia*, *Flabellomicrosiphum tridentatae* (Wils.) on *Artemisia tridentata*, *Microsiphum artemisiae* (Gill.) on *Artemisia vulgaris* and *A. tridentata*, *Amphorophora nervata* (Gill.) on *Rosa*, *A. ribiella* (Dav.) on *Ribes*, *A. rubicola* (Oest.) on *Rubus*, *A. sonchi* (Oest.) on *Ribes*, *Capitophorus glandulosus* (Kalt.) on *Artemisia*, *C. gregarius* Knlt. and *C. oestlundi* Knlt. on *Chrysothamnus nauseosus*, *Kakimia cynosbati* (Oest.) on *Ribes*, *Macrosiphum packi* Knlt. on *Chrysothamnus nauseosus*, and *Thecabius populi-monilis* (Riley) in bead-like leaf galls of *Populus angustifolia*.

NOTES ON THE HISTERIDAE (COLEOPTERA) KNOWN TO OCCUR IN NEVADA

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Twenty species of this distinctive family seem to be the sum total at present known from the State, only a small proportion of which have previously been recorded. The few species described from Nevada are mainly the result of Dr. Horn's pronounced interest in the little-known Western fauna in the middle decades of the last half of the 19th Century, at which time Nevada was so far removed from entomological notice that any specimens obtained from it were thought sufficiently placed as to locale by the mere mention of the State. Rarely is it possible, in these early papers, to find specific localities within the State mentioned by collectors. Undoubtedly the vast confines of Nevada were generally held by eastern workers to represent one ecological continuity in which place names were of little importance. The entire West was so regarded at one time, but the practice with regard to Nevada seemed to have endured longer than with surrounding states which became better known.

I am indebted to Dr. E. S. Ross for most of the determinations.

HOLOLEPTINAE

1. *Hololepta aequalis* Say 1825. Lincoln County (Alamo, 17/I/41, el. 3800 ft—LaR); Washoe County (Truckee Meadows, 5/XII/39, el. 4500 ft—LaR). This species is taken in large numbers beneath the bark of cottonwood trees (*Populus fremonti* and *P. trichocarpa*) which in Nevada are confined naturally to watercourses of the few major streams, largely at valley-floor elevation. The Truckee and Carson rivers often bear large stands of these trees, especially along their banks where meanders have created widened riverbottoms in their courses through desert areas. The species prefers recently-dead trees in which the bark is still tight enough for extensive bacterial decay, a situation to which its extremely flattened form admirably adapts it. Its associates are quite constant, and include *Cucujus clavipes puniceus*, another flat species, and the histerids *Platysoma lecontei* and *Paromalus aequalis*. This is the farthest western record of the species, it previously being unknown west of the Rockies. It undoubtedly occurs in Utah, but to my knowledge, has never been recorded from there. The fact that it has been found in two widely-separated localities in Nevada militates against the supposition that it may have been introduced originally with unbarked cottonwood logs from farther east. If it should prove an isolate in the Great Basin, its dis-

tribution here may shed some light on Pleistocene and Post-Pleistocene distribution of members of the genus *Populus*, which certainly enjoyed a wider and more uniform spread in the Great Basin than is apparent today. I have seen it feeding on *Cucujus clavipes puniceus* larvae in the vicinity of Reno.

HISTRINAE

HISTRINI

2. *Hister solaris* Carnochan 1915. Humboldt County (PARADISE VALLEY sand dunes, 18/VI/41, el. 4800 ft—LaR & C. C. Christensen); Washoe County TRUCKEE MEADOWS, 23/III/41, 13/IX/41, el. 4500 ft—LaR). A species not uncommon under animal carcasses. The type locality is Wenatchee, Washington, and Carnochan also had specimens before him from Oregon, Wyoming and Nevada (no specific mention) when describing it.
3. *Hister militaris* Horn 1870. Washoe County (TRUCKEE MEADOWS, 18/IV/40, el. 4500 ft—LaR. Horn described the species from a single specimen collected at Ft. Yuma, California, and it was later recorded from Arizona. My present data indicate it to be an uncommon species. No previous record.
4. *Hister umbilicatus* Casey 1893. Washoe County (TRUCKEE MEADOWS, 11/II/40, el. 4500 ft—LaR). Originally described from California. No previous record.
5. *Hister bimaculatus* Linné 1758. Washoe County (TRUCKEE MEADOWS, 22-23/II/41, 19-26/IV/41, el. 4500 ft—LaR). This European species has long been known from most of the rest of the United States. No previous record.
6. *Teretrius placitus* Horn 1880. In his original description, Horn says: "Collected by Mr. H. K. Morrison, in western Nevada." It has since been found in southern California. I do not have the species.
7. *Platysoma lecontei* Marseul 1853. Washoe County (TRUCKEE MEADOWS, 5/XII/39, 2-15/III/41, el. 4500 ft—LaR). The locality given by the describer was "Etats-Unis, sous les ecorces des arbres." See *Hololepta aequalis*. No previous records. It is generally distributed east of the Rockies, and has been taken in southern California.
8. *Platysoma punctigerum* LeConte 1861. Douglas County (LAKE TAHOE, 12/IV/41, el. 6300 ft—LaR & T. J. Trelease); Washoe County (TRUCKEE MEADOWS, 8-16/III/41, el. 4500 ft—LaR). Also known from California and Arizona. No previous records.
9. *Psiloscelis subopaca* LeConte 1863. Elko County (RUBY MOUNTAINS, Lamoille Canon, 25/VI/41, el 7000 ft—LaR & G. C. Christensen). This distinctive species has been taken only in the eastern part of the State, where it was not uncommon at the single locality collected. It was taken in ant nests with *Cremastocheilus angularis montanus:* No previous records.
10. *Paromalus aequalis* Say 1825. Washoe County (TRUCKEE MEADOWS, 5/XII/39, 5/III/41, el. 4500 ft—LaR). The discussion of distribution under *Hololepta aequalis* seems to apply equally to this species, both occupying the same environment, and probably distributed by the same agencies. *Paromalus* is much smaller than *Hololepta*, and much more numerous where collected. To my knowledge, this is the westernmost record, and the first for the state. The species is well known east of the Rockies.
11. *Plegaderus fraternus* Horn 1870. Nevada is the type locality. Horn wrote at the time of describing: "two specimens from Nevada, from Mr. Wm. M.

Gabb." It has since been found in California and Arizona. I do not have the species.

12. *Plegaderus nitidus* Horn 1870. Also described from Nevada. "Three specimens from Nevada, one of which was sent me by Mr. Henry Edwards, of San Francisco" (Horn 1870). Now known from Oregon and California as well. I have no specimens.

SAPRININI

13. *Saprinus discoidalis* LeConte 1851. Washoe County (Truckee Meadows, 9-23/III/41, el. 4500 ft—LaR). No previous records.
14. *Saprinus lugens* Erichson 1835. Douglas County (Lake Tahoe, 12/VI/41, el. 6300 ft—T. J. Trelease); Elko County (Elko, 30/VI/41, el 5000 ft—LaR & G. C. Christensen); Humboldt County (Denio, 1 mile south of, 24/VI/41, el. 4500 ft—LaR & G. C. Christensen); Washoe County (Truckee Meadows, 9/III/41, el. 4500 ft—LaR). The commonest large *Saprinus*, widely-distributed over the State under animal carcasses. No previous records.
15. *Saprinus oregonensis* LeConte 1845. Elko County (Elko, 10/VI/39, el. 5000 ft—LaR); Humboldt County (Paradise-National Summit, 21/VI/41, el. 7600 ft—LaR & G. C. Christensen); Washoe County (Peavine, 11/VIII/40, el. 5000 ft—LaR). Another very common species, also found in Arizona and southern California. No previous records.
16. *Saprinus ciliatoides* Fall 1917. Described by Fall from "Nevada, Las Vegas. One specimen." (Clark County). Apparently it has been found nowhere else. I do not have specimens of it.
17. *Saprinus scabriceps* Casey 1916. Described from Nevada. I have not seen the species.
18. *Saprinus lubricus plenus* LeConte 1851. Humboldt County (Paradise-National Summit, 20/VI/41, el. 7600 ft—LaR & G. C. Christensen); Washoe County (Truckee Meadows, 13/IX/40, 23/III/41, el. 4500 ft—LaR). Common and well-distributed. No previous records.
19. *Saprinus fimbriatus* LeConte 1851. Washoe County (Truckee Meadows, 23/III/41, el. 4500 ft—LaR). A general southwest species. No previous records.
20. *Saprinus fraternus* Say 1823. Washoe County (Truckee Meadows, 14/IX/40, el. 4500 ft—LaR). Predominantly an eastern species, this seems to be a considerable westward extension of its range. No previous records.

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SOME SALIENTIAN ADAPTATIONS[1]

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According to one common viewpoint, many and perhaps most characteristics of organisms have evolved through protoplasmic response to changing environments so that the present fauna and flora of a given region are generally adapted to the characteristic environment which they now occupy. In extreme cases, the geographic distribution of a species may be partially or wholly controlled by such ecological adjustments; but in less specifically adapted groups, the potential range of a species may not yet have been realized, so that introduction of some of its members into a new region results (or may result) in permanent occupancy of it. Between these two extremes, so many intermediate conditions occur that a whole volume would hardly suffice merely to record them.

Generalizations such as those just stated are practically truisms of biology. They are introduced here only as background for the interpretations of some observations made in recent years among the Salientia of Oklahoma. Twenty-seven species or subspecies of frogs and toads representing five families, and seven genera are now known to occupy this state. But they are not universally distributed; and, more important, they are not distributed consistently in accordance with their taxonomic groupings. For example, in the Hylidae, one species and a number of subspecies of another are limited to the southeastern corner of the state; one occurs only along its eastern edge; another occupies approximately the eastern half, but is ecologically limited to areas of woodland and savannah; one species is limited to regions of grassland, which means, geographically, to approximately the western two-thirds of the state; still another occupies tall-grass prairie and woodland in abundance and mixed prairie rarely. It has not been found in the high plains (short-grass prairie) in western Oklahoma but does occur in New Mexico and in the Texas Panhandle in similar ecological communities. They are distributed over most of Oklahoma but one of these never occurs in deep woods and the other is rarer to the west (short-grass prairies) than to the east (mixed-grass, savannah, and woodland).

1 Based upon a paper presented recently at the Boston Meeting of the A. A. A. S., Dec. 28, 1946.

One might expect the frogs (genus Rana) to be limited to pond and stream sides: but this does not wholly explain their distribution in Oklahoma. Six forms are recognized. One of these is limited to the Northeast, three to the Southeast, and the other two are found abundantly in all parts of the state in proper microhabitats.

In the more terrestrial genus Bufo, seven forms are known. One is found abundantly in the eastern half of Oklahoma wherever woodland or savannah occur, except that it is rare in mountain valleys in the east. Another largely replaces it in such valleys, is very abundant in the eastern woodland areas (except on mountains) but does not enter savannah to the westward. Three species are limited to prairie, one to short-grass in western and southern Oklahoma, one to mixed prairie and the ecotone between this and the tall-grass prairie in the Northeast, the third to the short-grass plains in the West and their ecotone with the mixed prairies in south-west-central Oklahoma. One subspecies is very abundant in all parts of the state except in the southeastern woodlands where its distribution stops quite abruptly as another intergrading subspecies replaces it. The seventh form is very rare and known only from very rough, rocky areas mostly in the west and south.

In Microhyla, two subspecies occur. One is limited to the eastern woodland areas;; the other replaces it to the westward and occupies all of the remainder of the state geographically except the panhandle where it may occur but is as yet unknown. But this second form seems ecologically restricted from low areas since, with ample opportunity to observe it, I have never found it on the flood plains of the larger rivers, whether they adjoined woodland, prairie or savannah in the region under observation.

In the spadefoots (genus Scaphiopus) four species occur, three limited to prairie, the fourth, to savannah and woodland. Two of the prairie-limited species occur only in short-grass plains (western); the second is in all prairie areas. It is, however, rare in the tall-grass prairie to the northeast.

The distributions given are based upon extensive observations in various parts of Oklahoma during eleven years, 1935 to 1946 inclusive, and hence are likely to be basically correct. Assuming their essential soundness, how much are they due to adaptation and how much to mere geographic factors exclusive of ecology? This problem has received my attention during the past four or five years during which I have studied and collected at least once in every part of the state—in many portions of it at several times.

Since the reproductive period of any organism, and the early period of the growth of its young, are critical ones for survival, these phases of life histories have been studied in greatest detail. All observations except measurements have been in the field, often at night during breeding activities of the adults; but tadpoles, resulting from breeding at known times, have also been under observation at many times and places, both day and night.

The greatest difference in adult behavior appears to be associated with a differential reaction to rainfall among the prairie-limited species, on the one hand, and among the woodland-savannah limited species on the other. In Bufo, for example, none of the prairie-limited forms have ever been found breeding except in temporary water during or immediately after rains of a half inch or more, regardless of season. But the species not so limited in distribution often breed in the springtime when no recent rain has occurred. In Pseudacris, one species *(Ps. clarkii)* is limited to prairie and behaves like the prairie limited toads; another *(Ps. streckeri)* is not prairie-limited, and does not thus behave.

Other species vary in the same way. Again, since the observations are quite extensive, there is little doubt as to their essential correctness. For example, I have a total of 120 records of breeding activities of *Bufo cognatus*, 112 of *Ps. clarkii*, 117 of *Ps. streckeri*, 83 of *Bufo terrestris americanus*, 129 of *Bufo v. woodhousii*, 64 of *Hyla v. versicolor*, 44 of *Ps. triseriata*, 80 of *Microhyla c. olivacea* and comparable numbers in several other species. Never have I found an exception. The prairie-limited forms breed after rain in temporary waters at any time from early spring to early fall; and they do not have a clear-cut breeding season. In contrast, those limited to woodland *do* breed within a definite breeding season. They are influenced to some extent by rainfall but are not controlled by it.

In earlier papers on the spadefoot toads (Bragg, 1944, 1945) I defined two types of breeding pattern (called there the mesic pattern and the xeric pattern) and it was pointed out that the spadefoots have the xeric one. I now wish to emphasize that the xeric pattern is shared by all prairie-limited species in Oklahoma, regardless of their taxonomic groups. And there is no reason to suppose that the phenomena involved are limited to this one state. Similarly the mesic pattern is typical of species limited to the woodland and savannah. Some species which occur in both prairie and savannah (e. g., *M. c. olivacea*) also have the xeric pattern and one species of the savannah and woodland areas shows it also. This is the spadefoot, *Scaphiopus hurterii*, the

only species known certainly in Oklahoma to follow its taxonomic relatives rather than the environment in breeding pattern, although there is some evidence that *Microhyla c. carolinensis* may do so.

From the viewpoint of adaptation, it seems to me significant that amphibians which are limited in distribution to a relatively dry environment should breed only after rains and in temporary water. For to do so consistently obviously serves the biological function of individual, and therefore species, survival. The evidence is in favor of a Darwinian factor in this, for only those which take advantage of the period immediately after rains have much chance for the survival of their tadpoles, season after season. Thus, selection has favored those which varied in the direction of discarding a breeding season in favor of breeding after rain regardless of season.

To emphasize such facts as indicating an adaptation to dry environment one need only to consider evaporation rate in pools and growth rates of tadpoles in them. Spadefoot tadpoles may metamorphose and leave pools in three weeks from egg-laying. Even so, many thousands are lost to the species each year because pools evaporate too quickly. The same is true of the prairie toads. I have seen metamorphosed tadpoles of *Bufo cognatus* leave the pools in 28 days after egg-laying; but, nevertheless, there has not been a generally successful breeding of this species about the city of Norman since 1941; yet each year some eggs have been laid. This lack of success in reproduction has been entirely due to loss of all tadpoles by the total evaporation of the water before the larvae could complete the aquatic phase of existence.

Spadefoot tadpoles seem to have carried these adaptations farther than any of the other forms so far known. Not only do they have an intrinsically faster development than any other North American forms but they seem especially adapted to resist heat. While this has not been studied in detail, as it needs to be, I have seen them developing normally in water at above 35° C., a temperature some mesically adapted tadpoles cannot withstand. Furthermore, the tadpoles of some species become cannibalistic while socially aggregated, thus assuring food to at least some individuals even though most must perish as the pool evaporates. Such activities were described in *S. h. holbrookii* by Ball (1936) working in Connecticut and have been confirmed recently by me for another species in Oklahoma (Bragg, 1946). The Oklahoma observations suggest that such activity is facultative, since individuals of the species involved (*Scaphiopus bombifrons* Cope) had never before been observed in such activities even though I had

watched the development and metamorphosis of its tadpoles on many occasions in Oklahoma and also in New Mexico (Bragg, 1941).

In summary, therefore, we may conclude:

(1) that prairie-limited Salientia in general in Oklahoma (and presumably elsewhere) are able to survive the rigors of a relatively dry environment through having evolved a special breeding behavior, called here the xeric pattern.

(2) that this pattern involves the same factors as those already described for the spadefoot toads, particularly in the lack of a definite breeding season, rainfall being substituted for an internal stimulus in the initiation of breeding activities.

(3) that these prairie forms generally differ from those limited to woodland in their breeding pattern, the one known exception being the savannah spadefoot, *Scaphiopus hurterii*.

(4) that not only adults but also tadpoles are adapted, the latter primarily through the evolution of a fast rate of development (aided of course by increasing heat as the water of the pool warms and evaporation rate increases), and (5) that these adaptations were probably evolved through selection in the Darwinian sense.

Further study of details is planned as time permits.

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FRANK ELLSWORTH BLAISDELL, SR. (1862-1946)

VASCO M. TANNER[1]
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Coleopterologists, especially those interested in Tenebrionidae and Melyridae, along with many friends, admirers and associates, will be saddened by the passing of Dr. Frank E. Blaisdell, Sr., in July 16, 1946, at his son's home in Watsonville, Santa Cruz County, California. Dr. Blaisdell, during his eighty-four years, lived through and participated in much of the development that has taken place in entomology and medicine in California.

Frank E. Blaisdell was born March 13, 1862, at Pittsfield, New Hampshire. The Blaisdell family left their New England home and moved to San Francisco in 1870, where they remained until 1873 when they moved to San Diego. Dr. Blaisdell's father was a saddler and harness maker. For two years he maintained a harness store on Fifth Street in San Diego. From 1874 to 1886 the Blaisdells engaged in farming in Poway Valley, where they took up a ranch. During this period, Dr. Blaisdell became a skilled teamster, a collector of insects, and a keeper of an apiary. He served as county entomologist of San Diego in 1886. Dr. Blaisdell's desire for learning caused him to leave the ranch and take up the study of medicine. For a year he clerked in a stationery store and read medicine with Drs. P. C. Remondino and C. C. Valle. In 1887 he left home for San Francisco to enter the Cooper Medical College. The course of study was completed and Dr. Blaisdell was graduated with the degree of Doctor of Medicine in 1889. In November of this year, Dr. Blaisdell returned to San Diego where he practiced medicine for three years. In search of greener pastures, in 1892 he left San Diego again for San Francisco to find a new location. He learned of a location at Mokelumne Hill, Calaveras County, California, where he located, practiced medicine, and collected insects until 1900.

Soon after Dr. Blaisdell began practicing at Mokelumne Hill, he met his future companion and wife, Miss Ella Katherine Peek, and they were married February 18, 1894. To them was born one son, F. E. Blaisdell, Jr., in 1896. Mrs. Blaisdell has been a very gracious

[1] Contribution No. 111.

and devoted helpmate to Dr. Blaisdell. Upon many occasions Mrs. Tanner and I have been delightfully entertained by the Blaisdells.

When Dr. Blaisdell gave up the practice of medicine at Mokelumne Hill, he decided to take a vacation by going to Nome, Alaska. In September he took passage on the steamer Valencia. For several weeks he collected Coleoptera in many Alaskan places. Upon his return he was appointed to a teaching position in Cooper Medical College, 1900. During the next ten years, Dr. Blaisdell advanced in teaching rank, and many responsibilities were given to him. In 1909 he spent a year at John Hopkins in Baltimore studying medicine. On week ends he collected in the vicinity of Baltimore and Academy Junction between Washington and Baltimore, as well as at the Philadelphia Academy of Sciences. In 1910 when the Cooper College was affiliated with Stanford University, Dr. Blaisdell was then Professor of Anatomy and head of the Department. After the affiliation he was made Professor of Surgery in what was then known as the Stanford Medical College. This position he held until September, 1927, when he retired as Professor of Surgery Emeritus, at the age of sixty-five years.

Throughout all of Dr. Blaisdell's medical career he was active in his avocation, that of collecting and studying insects and birds. He amassed a large collection of beetles, especially tenetrionids. When in 1906 the earthquake and fire destroyed most of the business district and the California Academy of Science in San Francisco, he was very active in helping to save what he could of his collection, as well as some rescued from the Academy building. He told me about carrying on his back for days, at this time, several boxes containing types and determined specimens of Coleoptera in order to save them from destruction.

I first became acquainted with Dr. Blaisdell during the summer of 1921 while I was a student at Stanford University. This acquaintance grew into an enjoyable association of lasting friendship. I was greatly indebted to Dr. Blaisdell for his whole-hearted support in supplying me with rare species of Coleoptera when I was studying the morphology of the female genitalia of Coleoptera.[2] From his large beetle collection he gave to me freely of any species in it. Without this aid it would have been impossible for me to study as many genera and families as I did. Then, too, he has given freely of his time in making determinations of specimens submitted to him. Every year

(2) Tanner, Vasco M., 1927. **"A Preliminary Study of the Genitalia of Female Coleoptera."** Trans. Am. Ento. Soc. LIII, pp. 5-50. pls. 2-15.

for twenty years he made many determinations of Coleoptera which I submitted to him. As a result I now have a large collection of Blaisdell determined Tenebrionidae and Melyridae which are indispensable in a study of these families.

Dr. Blaisdell was the author of one hundred papers dealing with Coleoptera. He began publishing in 1892 and continued up until 1945. Many of his papers are of considerable length and well illustrated. His writings on the beetles consist of more than 1400 pages. Dr. Blaisdell tried to relate his descriptions to morphological characters. He studied the genitalia of many species. In his paper "Studies in the Tenebrionid Tribe Scaurini: A Monographic Revision of the Eulabes," he made an attempt at correlating the nomenclature used by the writer in studies of female genital structures of beetles with his studies of male structures. His notable study of the Eleodiini, 1909, deals with the male genitalia.(3) Many of his descriptions of new species include a discussion of genital characters. Dr. Blaisdell's knowledge of human anatomy carried over into his study of insects to a greater extent than is the case with many workers trained in vertebrate anatomy.

Practically all of Dr. Blaisdell's entomological papers, with the exception of the most recent ones, are to be found listed in the bibliography of the Leng Catalogue of Coleoptera of America, North of Mexico, and the four supplements, 1920-1939. Students interested in his specialties are referred to the above publications.

In 1928 Dr. and Mrs. Blaisdell spent five months on a trip and vacation. They visited the old home in Pittsfield, New Hampshire; also with Dr. Henry Fall in Tyngsboro, Massachusetts; at Harvard College Collections; at the Museum of Natural History in Philadelphia; the National Museum; and spent a week at the International Entomological Congress at Cornell University in Ithaca, New York. Mrs. Tanner and I were fortunate enough to get rooms at a private home along with the Blaisdells. This association added much to the enjoyment and value of the Conference for us. We then visited the Niagara Falls together. The Blaisdells returned to California by way of the Atlantic States, New Orleans, and Texas.

As I draw to a close this brief sketch of Dr. Frank E. Blaisdell, a man whom I greatly admired and respected for his genuineness and desire to help others, I do so knowing full well that it is a privilege to pay tribute to his memory. Dr. Blaisdell inherited a strong body and a keen intellect. His good nature and personal charm of manner

(3) Blaisdell, F. E., 1909. "Monograph of the Eleodiini": Bull. U. S. Nat. Mus. 63.

drew his friends close to him. His long life was filled with much satisfaction because of the joy he received from his wife, grandchildren, and host of friends. Students who use the Coleoptera Collection at the California Academy of Sciences will long be indebted to him.

A NEW SUBSPECIES OF ENOCLERUS FROM THE GREAT BASIN REGION OF THE WESTERN UNITED STATES (COLEOPTERA: CLERIDAE)

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Enoclerus eximius trullionis Barr, new subspecies

Similar in size, form and structure to *eximius;* pronotum with a rather broad, transverse, triangular black area on disk, pubescence of this black area consisting of numerous, long black hairs, remainder of pronotum densely clothed with long gray hairs, intermixed with a few, long black hairs; elytra with a broad, black band covering basal third, very slightly prolonged posteriorly at suture, this black band densely clothed with rather long, erect black hairs, scutellar area rather densely clothed with long, erect gray hairs, remainder of markings and pubescence as in *eximius.* Length: Male, 8.5 mm; female, 10.5 mm.

Holotype, male, from Reno, Navada, May 25, 1941; allotype, female, from same locality, June 1, 1941. Both specimens collected by Ira La Rivers and deposited in the writer's collection. Thirteen paratypes from the following localities: Reno, Nevada, May 1939, (La Rivers); May 25, 1941, (La Rivers); Shell Canyon, Ruby Mountains, Nevada, July 11-12, 1913, (J. R. Slevin); Mountain City, Nevada, July 16, 1939, (La Rivers); "Nevada"; Wallowa Mountains, Baker County, Oregon, July 7, 1922, (Van Dyke); Pocatello, Idaho, June 18, 1941, (G. P. Mackenzie); Tuttle, Idaho, May 29, 1938, (D. E. Fox); Snowville, Utah, April 28, 1931, (G. F. Knowlton); Beaver Canyon, Utah, June 1923.

Paratypes in the collection of the California Academy of Sciences, U. S. National Museum, I. La Rivers, G. P. Mackenzie and the writer.

Trullionis is undoubtedly confused in many collections with *eximius eximius;* however, it presents several differences in color and pubescence which readily separate it from this typical subspecies. The broad, black basal band on the elytra and the broadly triangular, black discal area on the pronotum of *trullionis* are its most conspicuous characters and no intergradation toward the three, black, sub-basal elytral spots and the two, black pronotal spots of the typical *eximius* have

1 The writer is indebted to E. C. Van Dyke, E. A. Chapin, H. Dybas, I. La Rivers and G. P. Mackenzie for the loan of material used in this study.

been seen. Apparently this subspecies is restricted to the Great Basin Region and probably represents a geographical replacement of *eximius eximius*, which rather commonly occurs in the coastal ranges, valleys and the western slopes of the Sierra Nevada and Cascade Mountain Ranges of the Pacific States and southern British Columbia. Several specimens of typical *eximius* have been seen from localities well outside of this range, however; these include: Walker River, Mono County, California, June 25, 1937; Aspen Grove, Mount Timpanogos, Utah, July 6, 1935; Logan, Utah, June 7, 1933, (T. O. Thatcher); and Teton National Park, Wyoming, July 1937.

Champlain[2] records *Enoclerus eximius* from the Chiricahua Mountains, Arizona, but no material from this region has been seen by the writer.

2 Boving, A. G. and A. B. Champlain, 1920, Proc. U. S. Nat. Mus., 57: 631.

ANOPHELES MOSQUITO RECORDS AND OBSERVATIONS IN MONTANA *

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The persistence of malarial infections in returned service men has evoked among public health personnel a renewed interest in anopheline mosquitoes. In areas such as Montana, where malaria has never been a problem, knowledge of potential vectors is often fragmentary. This inadequacy applies equally to distributional facts and to observations on mosquito habits and life histories.

Although anopheline mosquitoes have been known to occur in Montana for many years, Mail (1934) could cite only seven records for the two species, *Anopheles punctipennis* and *Anopheles maculipennis*, taken in the State. The former was reported from a single locality, and six scattered collection points were indicated for the second species.

Aitken (1939) distinguished three subspecific forms of *Anopheles maculipennis* in North America. Two of these were characterized by unicolorous wings: *Anopheles maculipennis freeborni* Aitken from the United States west of the Continental Divide, and *Anopheles maculipennis aztecus* Hoffman from the Valley of Mexico. *Anopheles maculipennis occidentalis* (D. and K.) recognized by a bronze or silver patch on the apical wing fringe, ranges in a narrow strip along the west coast, north to the Canadian Northwest Territory and across the continent below the international boundary to New England. Aitken's subsequent studies of the *Anopheles* complex (1941, 1945) included examinations of all available Montana material. Most of the *maculipennis* specimens had the silver-tipped wings of *occidentalis*, but *freeborni* was represented in collections from the Bitter Root Valley of western Montana.

Collections and observations made by the writer during the spring of 1946 yielded more material from western Montana than had been anticipated. Random collections were made during April, and a more complete survey was conducted in May. The gross results of the 1946

* The author wishes to acknowledge the encouragement of Dr. H. B. Mills, State Entomologist, and Dr. B. K. Kilbourne, Secretary, State Board of Health, in the 1946 survey. The kindness of Dr. C. B. Philip, U. S. Public Health Service, Rocky Mountain Laboratory, Hamilton, Montana, in forwarding mosquitoes from that laboratory, is much appreciated.

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collections have been summarized elsewhere (Pletsch, 1946). Larval collections were carried out in 47 localities covering 10 western Montana counties. Eleven positive samples were obtained, representing 7 of the 10 counties. Adult mosquito collections were made in 55 localities throughout 11 counties. Adult *Anopheles* were captured in 12 of these localities representing 7 of the 11 counties. These findings emphasized the desirability of a recapitulation of Montana *Anopheles* records, observations, and collected specimens. Observations in this north temperate area are needed to supplement the published data on nearctic anopheline distribution and habits (King and Brandley, 1941).

Figure 1 graphically summarizes Montana anopheline collections to date. Identification of specific collection points may be accomplished from the detailed tabulation of specimens, presented as an appendix to this paper.

Anopheles maculipennis freeborni Aitken has now been found in four Montana counties, all west of the Continental Divide, at elevations ranging from 2700 to 3900 feet above sea level. This form is a recognized malaria transmitter in California. The more recent collections confirm and augment the Montana distribution of *freeborni* as shown by Aitken (1941, 1945). Seasonal collection dates extend from May 28 to November 22. Both male and female *freeborni* were present in the three series collected in May, 1946. The May 28 collection in Sanders County included 33 females and 27 males, all under a single highway bridge. A nearby marsh yielded only one *Anopheles* larva, yet the finding of numerous males suggested the completion of one generation before the end of May.

Anopheles maculipennis occidentalis (D. and K.) is clearly Montana's most widely distributed anopheline form. In line with the adaptability indicated by its extensive North America distribution, it has been collected in Montana from 13 counties on both sides of the Continental Divide, and at elevations from 2100 to 4500 feet above sea level. Specimens from the lower altitudes (Blaine, Phillips and Valley counties) have not been examined by the writer but were listed by Aitken (1945). Altitude apparently exercised an effect on *occidentalis* only over a very wide range, while *freeborni* is found only in the mountain valleys. The general prevalence of *occidentalis* in western Montana, and its overlapping with *freeborni*, suggests a logical revision of Aitken's distribution May (1945) to show the concurrence of these two forms west of the Continental Divide (one collection in Lake County yielded six *freeborni* and one *occidentalis* beneath the same highway bridge).

Seasonal collection data for *occidentalis* extend from April 12 to August 3. Several of the females collected by the writer on April 19 and 28, 1946, in abandoned tourist cabins appeared engorged or gravid. Two specimens from April 28 collection were dissected. The midgut of the first contained the remains of a recent blood meal. The abdomen contained 97 partially developed ova which lacked the elongate proportions of mature eggs. In the second specimen the gut showed no obvious blood meal, but the abdomen contained 126 elongate, well-developed eggs. All *occidentalis* specimens from the State now in the collections at Bozeman and Hamilton, Montana, are females with the exception of one male. This male and three female *occidentalis* were collected on May 30, 1946, near Kalispell (Flathead County).

In limited instances observers have found *occidentalis* rather common in the State. Dyar (1929) wrote of specimens later listed by Aitken as *occidentalis*. "The 'malaria mosquito' was rather common on the west side of Glacier Park in 1926, hibernating adults entering the cabin in early spring. Larvae were found in the warmer algae-filled pools along the larger lakes and marshes . . ." Mail (1934) did not include in his account of Montana mosquitoes a significant field observation made by him in 1929. On April 28 he collected near Manhattan (Gallatin County) specimens of *occidentalis* and noted, "Adults only . . . Certainly if these are hibernating adults they show remarkable preservation. Think personally they are this spring's emergence but they precede any of the local *Aedes*, none of which are out yet. In willow brush alongside river . . . adults biting fiercely and quite numerous."

A lone record of *Anopheles punctipennis* (Say) in Montana has been cited repeatedly in the literature. Mail (1934) wrote, "There is only one record of this mosquito in Montana and this is from Lolo in the Bitter Root Valley, on the Pacific side of the Divide," but he quoted Hearle's description of this species, "the writer not having a specimen of this species at hand." The collection at Montana State College includes one *Anopheles* specimen labeled, "Lolo, Mont. April 24, 1909," but this specimen is a typical *occidentalis*. Regardless of the status of the Lolo record, the occurrence of *punctipennis* in the State was confirmed during 1946 by three new records west of the Divide. On May 24 one female was found in an abandoned stable (Mineral County) where one *occidentalis* had been taken on April 19. A lone male *punctipennis* was found with 60 *freeborni* specimens collected in Sanders County (May 28). On May 30 several anopheline larvae and pupae were collected on a woodland pool near Polson (Lake County).

The water surface was almost covered with growths of *Lemna*, and the mosquito pupae had a distinctly greenish cast. Two *punctipennis* females emerged from this immature material.

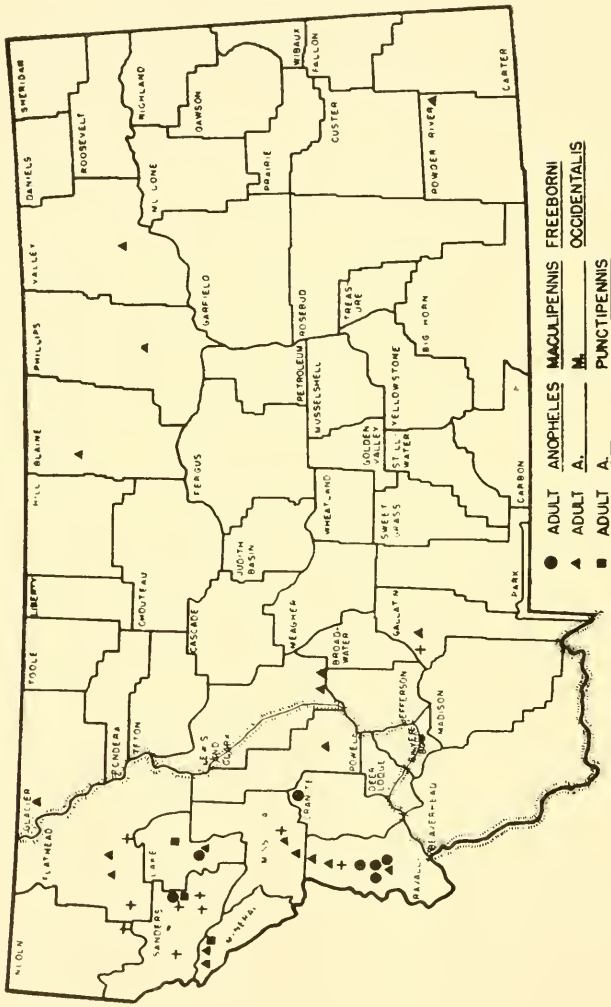

Fig. 1. Distribution Records for Anopheline Mosquitoes in Montana.

SUMMARY

1. An analysis was made of all available anopheline distribution records from Montana.

2. *Anopheles punctipennis* (Say) is recorded in Montana only from the Pacific side of the Continental Divide.

3. *Anopheles maculipennis freeborni* Aitken has been collected from western Montana at elevations ranging from 2700 to 3900 feet. *Anopheles maculipennis occidentalis* (D. and K.) has been taken from both sides of the Divide at a wide range of elevations (2100-4500 feet). Several localities in western Montana have yielded both *freeborni* and *occidentalis*.

4. Females of *freeborni* have been collected from May 28 to November 22, with numerous males found from May 28 to October 21. The more limited seasonal distribution of *occidentalis* includes females collected from April 12 to August 3. The only male on record was taken on May 30. Four specimens of *Anopheles punctipennis*, including one male, were obtained from May 24 to 30, 1946, in three Montana counties.

5. Dissection of *occidentalis* females collected on April 28, 1946, indicated the presence of well-developed eggs on that date. Egg counts from two dissected females showed 97 and 126 eggs present.

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RECORDS OF MONTANA ANOPHELINES

County	City	Date	Identified by	Remarks	Specimens now at
Anopheles maculipennis occidentalis (D. and K.)					
Ravalli	Florence	June 29, 1914	**		?
"	Victor	July 12, 1918	T. H. G. Aitken		Mont. State
Missoula	Lolo	Apr. 24, 1909	D. J. Pletsch		"
"	Missoula	June 24, 1914	T. H. G. Aitken	Acc. No. 112, 3	"
Gallatin	Manhattan	Apr. 28,1919	"	Acc. No. E29-314	"
Lewis and Clark	Helena	?	**		?
"	Clasoil	Apr. 12, 1932	T. H. G. Aitken		Mont. State
Glacier	No. Fk. Ranger Sta. Glac. Pk.	July 3, 1924	**		?
Blaine	Chinook	Aug. 3, 1927	**		?
Phillips	"	?	**		?
Valley	Glasgow	July 11, 1921	**		?
Powder River	Powderville	Apr. 21, 1916	**		?
Mineral	DeBorgia	Apr. 19, 1946	D. J. Pletsch	Acc. No. E46-11	Mont. State
"	Haugan	Apr. 28, 1946	"	Acc. No. E46-12	"
Ravalli	Darby	May 22, 1946	"		"
Flathead	Kalispell	May 30, 1946	"	Acc. No. E46-36	"
Lake	Ronan	May 30, 1946	"	Acc. No. E46-38g	"
Powell	Garrison	May 31, 1946	"	Acc. No. E46-41b	"
Anopheles maculipennis freeborni Aitken					
Ravalli	Hamilton	July 2, 1932	T. H. G. Aitken	"Goats"	Hamilton
"	"	Nov. 22, 1932	"		"
"	"	Aug. 8, 1933	D. J. Pletsch		"
"	"	July 1936	T. H. G. Aitken	Light trap	"
"	"	Oct. 20, 1939	"	Outhouse	"
"	Darby	Oct. 21, 1939	"		"
"	Lake Como	July 29, 1935	**		?
Sanders	Hot Springs	May 28, 1946	D. J. Pletsch	33 ♀ 27 ♂	Mont. State
Lake	Ronan	May 30, 1946	"	Acc. No. E46-38g	"
Granite	Bearmouth	May 31, 1946	"	Acc. No. E46-40	"
Ravalli	Hamilton	Nov. 7, 1946	"	"in occupied residence"	"
Anopheles punctipennis (Say)					
Mineral	DeBorgia	May 24, 1946	"		"
Sanders	Hot Springs	May 28, 1946	"	with 60 *freeborni*	"
9 Lake	Polson	May 30, 1946	"	reared from pupae	"
Anopheles maculipennis ? (De-scaled)					
Lake	Finley Point	Nov. 7, 1941	D. J. Pletsch	Numerous in outhouse	"
Flathead	Kalispell	May 29, 1946	"	under bridge	"

** Specimens listed by Aitken (1945)

GENERAL NOTES

Dragon Flies Feed on Termites

Dr. Tanner, sometime ago I mentioned an interesting phenomenon which I observed during the summer months, and I wish herewith to give you a written statement of that observation.

About the middle of August, 1941, while walking along the path immediately east of the President's home, I noted a large swarm of dragon flies. They kept darting downward, fluttering for a moment or two above the ground, and then sailing off. The swarm was very large, probably several hundred dragon flies, and they seemed to be concentrating in a relatively small area.

I walked into the center of the swarm and sat down to observe what was going on. I found that they were hovering immediately above a bed of what were probably termites. Many of these forms were in the flying stage, and as they began to fly upward the dragon fly would dart down, intercept them, and after a few deft twists and turns would nip off the abdomen. The head, thorax, and wings would then flutter to the ground. The ground was littered with dozens of these dismembered insects. I picked up several, thrust them in the air, and found that they had hardly begun to fly until the dragon flies were on them. The numbers of flying forms must have been large, but I should judge that a great proportion of them had been dismembered by the dragon flies.

The following morning I again observed the swarming area, and although all living forms had disappeared, the ground still showed many of these dead half-bodies. The dragon flies apparently must have eaten the abdomen completely, since I saw no evidence of the outer abdominal cases.—Dean A. Anderson, B. Y. U.

Ranatra Quadridentata Stal (Nepidae) Found in Utah

While studying the aquatic life of Salem Pond in April, 1940, two specimens of water scorpion, *Ranatra quadridentata* Stal., were collected. This is a new record for the State of Utah. According to Dr. Hungerford this species is distinctive and should not be considered as a synonym of *R. americana* Montandon.

Two other species of this family have recently been added to the Brigham Young University entomological collection. They are *Ranata nigra* Herrich-Schaffer, collected at Urbana, Illinois, September, 1939, and *R. burmai* Hungerford collected at Reelfoot Lake, Tennessee by Prof. C. Lynn Hayward.—Vasco M. Tanner.

Sage Hens Killed on Highway

The writer has had an opportunity to observe the animals killed on the motor highways in various parts of the nation during the past year. To my surprise I have found several species of snakes, frogs, toads, salamanders, rabbits, squirrels, mice, porcupine, badgers, opossum, magpies, English sparrows, night hawks, pheasants, and sage hens killed by the automobile. Among the birds is a species that is becoming rare in Utah, the sage hen, *Centrocercus urophasianus* (Bonap.). Thirteen young birds, about half grown, were found crushed to death on U. S. Highway 40 between the head of Daniels Canyon and Fruitland, in Wasatch and Duchesne Counties, Utah. These were observed while traveling over the road three times, once in July and twice in August. Old birds with their flocks were fairly common along this part of Highway 40 during this period. They move about crossing back and forth over the road in search of insects and seeds. In doing so they are easy marks for the fast driving motorist. On highways where traffic is heavy the carcasses of animals are soon ground to dust. In intervals of one week I have found that the bodies of rabbits have been worn away and have disappeared from the highway. Magpies and crows feed on the highway kill.

I call attention to this loss of sage hens since this species is protected in this area. The annual mortality must be high, judging from the kill noted above. Signs warning motorists of the presence of sage hens may be of some value in reducing the loss of this species.—Vasco M. Tanner, December, 1946.

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